I. REMARKS

Claims 1-17 and 19-110 are pending. The Examiner requires restriction of the present application to one of the following inventions:

Group I: Claims 1-6, 22-32, 63-66, 81-84, 90-92, 98, 102, 106 and 110, drawn to a copper alloy material in wire or bar form; and

Group II: Claims 7-17, 19, 33-62, 67-75, 85-89, 93-97, 99-101, 103-105 and 107-109, drawn to a copper alloy material in wire or bar form comprising 0.0008 to 0.45 mass% Zr and the average grain size is 0.2 mm or less after melt-solidification; and

Group III: Claims 20, 21 and 76-80, drawn to a method for manufacturing the copper alloy material in wire or bar form, the method comprising a casting step in which Zr is added in a form of a copper alloy containing Zr immediately before pouring.

The Examiner contends that the inventions of Groups I and II are distinct from each other because they allegedly do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they allegedly lack the same or corresponding special technical feature because the special technical features of Group II are 0.0008 to 0.45 mass% Zr and the average grain size is 0.2 mm or less, which is not shared by Group I.

The Examiner contends that the inventions of Groups II and III are distinct from each other because they allegedly do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they allegedly lack the same or corresponding special technical feature. Specifically, the Examiner contends that Parikh et al. (U.S. Patent 4,047,978, hereafter the "Parikh Patent") discloses a copper base alloy that overlaps the invention alloy corresponding to Applicant's claim 7, and that the Parikh Patent discloses the composition is prepared by casting. The Examiner contends that the recited phase structure would be expected (i.e., inherent) in the alloy of Parikh thereby rendering the invention of

Group II allegedly unpatentable over the Parikh Patent so that the inventions of Group II and III lack the same special technical feature.

The Examiner contends that the inventions of Groups I and III are distinct from each other because they allegedly do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they allegedly lack the same or corresponding special technical feature because the special technical feature of Group III is Zr added in the form of a copper alloy containing Zr, which is not found in the invention of Group I.

Applicant elects the invention of Group I, claims 1-6, 22-32, 63-66, 81-84, 90-92, 98, 102, 106 and 110, for further prosecution on the merits. The election is made without traverse.

A. The Parikh Patent

The Parikh Patent discloses "processing copper base alloys," which pertains to a process for obtaining a desired combination of strength and bend properties in copper base alloys having low stacking fault energy, wherein the process is characterized by a critical combination of cold reduction and annealing following recrystallization (See Abstract of the Parikh Patent). Thus, a person of ordinary skill in the art would instantly realize that the Parikh Patent aims to provide a desired combination of strength and bend properties, which is substantially different from the object of the present invention. Specifically, the present invention provides a copper alloy material having improved seawater resistance and wear resistance, which makes it usable for making fish cultivation nets without losing any of the desirable properties of a copper wire. Accordingly, a person of ordinary skill in the art would instantly appreciate that there is a substantial difference between the alloy disclosed by the Parikh Patent and the presently claimed invention alloy.

With respect to claim 7 of the above-captioned application, the embodiment of this claim is characterized in that the metal structure of a casting, after melt-solidification, has refined grains with an average diameter of less than 0.2 mm. On the other hand, the Parikh Patent discloses a grain size of less than 0.15 mm in the recrystallized form, which is produced after the production steps consisting of casting, hot rolling, cold rolling, and then annealing. The alloys of the present invention pertain to casted copper alloy material, which is substantially different with respect to grain size from Parikh's alloy that has undergone hot rolling, cold rolling and then annealing after casting. As would be known by persons of ordinary skill in the art, castings generally have coarse grains. It is difficult for researchers in the art to obtain fine grains, as small as less than 0.2 mm, in casted copper alloy material, such as is achieved by the presently claimed invention.

Filed herewith labeled as "Exhibit A" are pages 629 to 631 of *Metals Handbook® Ninth Edition, Volume 9 Metallography and Microstructure*, which discloses an example of grain refinement for casting of aluminum alloy. Grain refinement in this case is achieved by the addition of titanium and boron (Exhibit A, at 630, right col., lines 1-17). As evident from Fig. 7 to Fig. 9 of Exhibit A, the grains in the macrostructure before grain refinement are within the range of a few to several tens of millimeters in size, whereas the grain size is still 0.3 mm to 1 mm even after grain refinement. In comparison to copper alloy material of the present invention, grains, in accordance with the present application, are refined to an extent that the grains are invisible to the naked eye. Persons of ordinary skill in the art would be surprised to see a grain size of less than 0.2 mm in a copper alloy material.

A person of ordinary skill in the art would also know that hot working, for example hot rolling as practiced by the Parikh Patent, col. 3, lines 33-38, is used to destroy the coarse structure of a casting to obtain a grain size of less than 0.1 mm. Furthermore, according to the Parikh Patent, the grain size becomes even smaller due to plastic deformation achieved by

cold working and subsequent annealing (Parikh Patent, col. 3, line 39, to col. 4, line 22). A person of ordinary skill in the art would not look to the Parikh Patent for guidance regarding obtaining a casted copper alloy material that has a grain size of 0.2 mm or less because the plate material disclosed by Parikh, which has been casted, has also subsequently undergone hot working, cold working, and annealing, and pertains to a plate structure exhibiting a grain size of less than 0.015 mm. A person of ordinary skill in the art would know that a grain size of 0.003 mm, or even 0.005 mm, is quite common for plate materials, but it is difficult to achieve in a casted material.

With respect to the alloy compositions, the Parikh Patent recites, in claim 10, a copper base alloy that contains at least one second element different from the first element selected from the group consisting of about 0.001 to 10% aluminum, about 0.001 to 4% germanium, about 0.001 to 8% gallium, about 0.001 to 10% indium, about 0.001 to 4% silicon, about 0.001 to 10% tin, about 0.001 to 37% zinc, about 0.001 to 25% nickel, about 0.001 to 0.4% phosphorus, about 0.001 to 5% iron, about 0.001 to 5% cobalt, about 0.001 to 5% zirconium, about 0.001 to 10% manganese and mixtures thereof. The second element is in addition to the first element, which, according to claim 1, is selected from the group consisting of about 2 to 12% aluminum, about 2 to 6% germanium, about 2 to 10% gallium, about 3 to 12% indium, about 1 to 5% silicon, about 4 to 12% tin, and about 8 to 37% zinc, wherein the balance of the alloy is essentially copper (Parikh Patent, claim 1).

Assuming *arguendo* that the composition disclosed by the Parikh Patent slightly overlaps the composition according to claim 7 of the above-captioned application, which includes Cu: 62-91%, Sn: 0.01-4%, Zr: 0.0008-0.045%, P: 0.01-0.25%, and the balance Zn, the probability of selecting Sn, Zr and P is less than 1:100. In addition, claim 17 of the present application defines iron and nickel as inhibitors of grain refinement, and the range of Zr is about $1/100^{th}$ that disclosed by the Parikh Patent. Overall, any alleged overlapping

based on the disclosure of the Parikh Patent with the invention of the present application appears to be less than a millionth (i.e., 1/1,000,000). The probability becomes even lower with respect to claim 11, which recites specific elemental relationships, such as $0.5 \leq [P]/[Zr] \leq 150$, $1 \leq [Sn]/[Zr] \leq 3000$, and $0.2 \leq [Sn]/[P] \leq 250$ in terms of mass%. Such remote probabilities are not obvious.

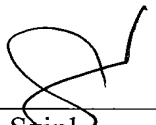
Persons of ordinary skill in the art would have no legitimate reason to refine the grains of the casting, in accordance with the present invention, based on the disclosure of the Parikh Patent because the Parikh Patent discloses fully refined grains in plate materials, which have been subjected to hot working, cold rolling and annealing.

For all of the above reasons, claims 1-6, 22-32, 63-66, 81-84, 90-92, 98, 102, 106 and 110 are not obvious in view of the Parikh Patent. Likewise, the claims of Groups II and III, above, are also not obvious in view of the Parikh Patent.

Accordingly, it is believed that the application is in good condition for examination. The below-signed attorney for Applicant welcomes any questions.

Respectfully submitted,

GRIFFIN & SZIPL, P.C.



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